

## **Light Brown Apple Moth (LBAM) Questions and Answers**

*Including information about pheromones, aerial treatment plans and other elements of the eradication effort.*

### **Is the aerial application of this pheromone safe?**

The pheromone materials Checkmate OLR-F and Checkmate LBAM-F have been reviewed and approved for aerial application by the federal Environmental Protection Agency (EPA) and the state Department of Pesticide Regulation (DPR). These pheromones and many others like them are present in our environment every day as many insects use them to attract mating partners or signal other behaviors. Humans and other mammals do not use these insect pheromones and cannot detect them. Studies of this pheromone in particular and about the interaction of pheromones and mammals in general have shown no evidence for concern about exposure to pheromones, even at much higher levels than those proposed for the aerial treatment of the Monterey Peninsula.

The EPA does not permit long-term human studies for any type of pesticide. Instead, the possibility of chronic effects is typically addressed by animal studies. Testing of the active ingredient on animals did not demonstrate any signs of poisoning. Proposed aerial treatments would apply a small fraction of the amount used for animal testing, indicating a large margin of safety for even the most sensitive groups.

In Australia, where the pheromone has been in use for several years, there has been no evidence of any health problems among the people living in rural areas where applications are made, nor among those who manufacture or apply the product.

The EPA has established that this is a very low toxicity material applied in a very dilute concentration. No illnesses related to the use of these materials have ever been reported, even by people handling concentrated forms of Checkmate or similar pheromone products used to control other insects. The State of California and US EPA have long maintained systems for tracking illness reports related to treatments. In addition, the USDA has certified this product and other pheromones for use on organic crops.

### *Related resources:*

The EPA provides an online summary of its quarantine exemptions for LBAM pheromones. At the bottom of this web page, several additional references and resources are provided:

[http://www.epa.gov/pesticides/local/region9/lbam\\_quarantine.htm](http://www.epa.gov/pesticides/local/region9/lbam_quarantine.htm)

The online Federal Register includes an informative page summarizing EPA's determinations about lepidopteran (moth) pheromones:

<http://www.epa.gov/fedrgstr/EPA-PEST/1995/August/Day-30/pr-388.html>

### **Have moth pheromones been used before? Where?**

Suterra, the manufacturer of Checkmate pheromone products, confirms that moth pheromones designed to create mating disruption have been applied aerially in the US for about 10 years against invasive moth infestations in Florida, Texas, Arizona, Oregon, Washington, New York, Pennsylvania and Michigan. Moth pheromone has also been applied aerially in South Africa, Argentina, Chile, Italy and Spain. The differences between these pheromones and Checkmate LBAM-F are small, with adjustments made for the specific make-up of the moth in question.

The USDA reports that another aerial moth pheromone manufacturer, Hercon, has applied pheromone in flake formulation in the greater Chicago and Madison WI areas for gypsy moth.

Pheromone treatments in general have an excellent track record against moths and other insect pests. Pheromones are a reliable method of treatment to control LBAM in New Zealand and Australia. LBAM is also present in Hawaii, but treatments have not been attempted there because of a number of factors, including the fact that the infestation is relatively small and restricted to higher elevations, and also because crop exports there are highly restricted and regulated due to a number of other invasive pest infestations.

### **Are the planes, treatment equipment and flight plans safe?**

The contractor Dynamic Aviation, their planes and the individual pilots are required to be reviewed and licensed/approved by the Federal Aviation Administration (FAA). CDFA has contracted with this company for many years for aerial release of sterile Mediterranean fruit flies in the Los Angeles basin, and their safety record is unblemished. Detailed flight plans are submitted to local aviation authorities for review in advance. To ensure that no contamination of the pheromone product occurs, the mixing, loading and treatment equipment is required to be new and dedicated to this project. We will conduct sampling of the pheromone mixtures and follow a strict chain-of-custody procedure in the delivery of these materials for testing. Strict protocols are also in place for the purchase, transport, storage, mixture and loading of the material to be used in the treatment.

### **If the proposed application is safe, why does your literature and the product label mention precautions?**

The EPA requires precautionary statements on every product it approves. The precautions on the label are relatively minimal when compared to the precautions typically seen on labels for conventional pesticides. Based on review and approval of this product by the EPA and the California Department of Pesticide Regulation (DPR), there is no human or animal health risk from exposure to the material during treatment. However, as we do with any aerial treatment, we advise those who wish to avoid unnecessary exposure to take simple precautions such as staying indoors or under cover, closing windows, removing laundry from outdoor lines, etc.

A complicating factor in this discussion is that a label for "Checkmate OLR-F" that has been circulated by members of the public is not the correct label for the product that will be used. The label that has been disseminated in error is appropriate only for treatments in agricultural areas where higher concentrations of the active ingredient are prescribed.

The warnings and precautions on this label are intended for trained workers who routinely and repeatedly handle concentrated, undiluted pesticide ingredients while they are being mixed and prepared for treatment. This information does not apply to those who may be exposed to a diluted form of the material to be used during an aerial treatment.

### **Why is this eradication project an emergency?**

Data from our statewide insect trapping efforts shows that this infestation is a recent arrival to California. The populations of LBAM are still relatively small and are considered by an international panel of expert scientists to be eradicable if significant action is taken promptly. These moth populations can grow exponentially, going through approximately five generations per year with each female moth laying hundreds of eggs. Failure to act quickly could result in uncontrolled spread and substantial environmental and economic impacts.

### **Who decides whether or not aerial applications are necessary? How is that decision made?**

At the direction of federal and state law, agricultural officials with the USDA and CDFA are responsible for eradicating invasive pests that threaten agriculture as well as the environment and natural habitat. Agency policy requires that we choose the most environmentally sensitive approach that will be effective against the infestation. For a project such as the eradication of the light brown apple moth, the agency secretaries are the primary decision-makers who rely on the scientific knowledge of staff as well as on consultations with their counterparts in health and environmental agencies and other experts. For the LBAM eradication project, CDFA and USDA appointed a technical working group of expert scientists to establish whether eradication is possible and, if so, to recommend the most environmentally friendly means of eradication. The proposed aerial treatment is a central element in that plan.

### **How long will the treatment project take?**

Each aerial treatment would take approximately three nights to apply the treatment over the entire eradication area. Wind or other inclement weather could delay or extend the treatment schedule. A second, identical treatment is proposed approximately one month after the first treatment. Depending upon subsequent trapping data, additional treatments may be necessary.

### **How do you protect against drift?**

The airplanes use pre-programmed GPS guidance systems to ensure even application of the treatment. The programming includes automatically turning the treatment off over bodies of water. The protocols call for treatment to occur only if wind and other weather conditions are within established limits.

### **How will these applications affect the environment, including the ocean?**

Pheromones are among the most environmentally friendly treatments ever used to eradicate a pest infestation in California. While conventional pesticides kill insects directly, the pheromones applied in this effort will simply confuse the male moths so that they cannot locate a mating partner, and the infestation eventually collapses as breeding

subsides. Pheromones also have the distinct advantage of affecting only a very limited number of closely related insects while leaving beneficial insects and endangered species unaffected.

Concerns have been expressed about exposure of fish and other aquatic species to the treatment. However, the treatments will not be applied over bodies of water, including the ocean. The pheromone breaks down in water and all of the ingredients are biodegradable, so runoff is not a concern.

#### **How would/does the light brown apple moth affect the environment?**

Because the LBAM feeds on hundreds of different kinds of plants, it presents a threat to trees and plants in the natural environment as well as in crops and landscaping. Cypress and redwood trees, Monterey pine, oaks, lupines and many other native species are included on the extensive “host list” for this pest.

If the infestation is not eradicated, another important environmental effect would likely be an increase in the use of conventional insecticides by many residents, businesses and public entities acting to protect the plants in their gardens, landscaping, parks and other areas.

#### **Will the pheromone harm the monarch butterfly? Are other moths affected by the pheromone?**

Although moths and butterflies are similar insects, the pheromones used by separate species are different. Monarch butterflies are not attracted to the light brown apple moth pheromone and will not be confused or otherwise affected by it. The pheromone treatment is water-based and contains no oils or other materials that would pose a threat to the Monarch population.

In the pheromone-based traps that we use to detect LBAM, we have trapped only limited numbers of five closely related moth species, further indicating the highly specific nature of this pheromone. Two of the five other moth species are also invasive, unwanted pests, although they do not pose the same level of threat as the LBAM. Because these other moths are permanently established in the surrounding region beyond the limits of the LBAM treatment area, any reduction in these populations would be expected to rebound after LBAM eradication treatments subside.

#### **How would/does the light brown apple moth affect the economy?**

The current LBAM infestation has already caused the nations of Canada and Mexico to impose onerous restrictions on exports of crops and plants from the infested areas of California. China also has begun the kind of information gathering that frequently leads to such trade restrictions. As businesses are forced to delay, reduce or abandon exports to these nations, employment, investment and tax levels are all adversely impacted. Internally, restrictions are also imposed by CDFA and USDA on businesses such as plant nurseries in the infested areas so that their counterparts outside of the area can be protected from the infestation. These businesses must comply with strict regulations that limit or delay the companies’ ability to export their plants outside the area. If the

infestation is not eradicated, these regulations and trade restrictions would continue indefinitely and other countries would likely adopt similar measures.

**What are the inert ingredients in the treatment? Are they safe?**

The inert ingredients in the formulation are water and biodegradable elements used to delay the release of the active ingredient so that the treatment will be effective for an extended period of about one month. The basic biodegradable “building block” is urea, a normal constituent of the human body that is derived from the breakdown of proteins that we eat.

**How will I be notified about the treatment?**

As required by state law, CDFA notifies all known residents of a treatment area by first-class mail in advance of an emergency treatment.

**How will you notify homeless people and others without a permanent address?**

In addition to sending the required first-class mailings to residents, we will work with local news media and elected officials and staff at the city and county levels to get the message out about the treatment schedule and other elements of the project. We also share information about the treatments in advance with local homeless shelters, farm worker organizations and other groups that have been brought to our attention by local officials or have requested information.

**Why are Pebble Beach and Carmel not included in the proposed treatment area?**

Portions of both Pebble Beach and Carmel are included in the proposed treatment area, while other portions of these communities are not. The treatment area is based on two factors: the biology of the pest (i.e., the distance it is capable of moving during its life cycle) and the location of the trap sites where moths were detected. Traps are distributed at a consistent ratio throughout the entire region so that the infested area can be determined with a high degree of accuracy. CDFA staff generate a GPS-driven map based on these factors, then draw a final boundary using the closest available roads or other physically identifiable lines.

**How have you communicated with environmental regulators? What have you communicated?**

We have provided details of our proposed treatment to a number of local, regional, state and federal groups including the United States Fish and Wildlife Service, the California Coastal Commission, the National Marine and Fisheries Service, the Monterey Bay National Marine Sanctuary and the Central Coast Regional Water Quality Control Board. Communications have included meetings, e-mail, telephone and mail. We also work with local news media and elected officials and staff at the city and county levels to get the message out about the treatment schedule and other elements of the project. The information includes details about the program components, treatment schedule, the affected area, the pheromone, and the availability of a toll-free number for further information.

### **When will you develop an Environmental Impact Report (EIR)?**

This pest has the biological ability to multiply quickly, so eradication efforts can only be successful if the efforts begin immediately. CDFA has declared an emergency to allow the eradication to begin under a temporary exemption from environmental analysis, with the understanding that a full environmental assessment of the project, including these emergency treatments, will be required. That assessment will likely take more than a year to complete.

### **Why not just let the apple moth be?**

If we do not eradicate this infestation, the moth would eventually multiply and spread to other areas of California, the United States and beyond. Farmers, residents, municipalities and other entities would repeatedly use pheromones and other, more toxic pesticides to suppress the infestation and protect their crops, landscaping and habitat. Populations of threatened and endangered species could be severely impacted should this moth adapt to feeding on them or competing with them for food or habitat. The impact on agricultural production of crops that are hosts of the LBAM could reach \$160 to \$640 million annually in the currently infested counties in California (source: USDA). Additionally, California would likely be placed under perpetual quarantine by neighboring states and trading partners around the world, restricting our ability to export crops and plants. Canada and Mexico have already imposed such restrictions, resulting in delays, added expenses and reduced export business for local growers.

### **Should I be worried about my pets?**

EPA's review of this pheromone product indicates it is highly specific for the apple moth and does not affect mammals. Pheromones are used by insects to trigger behaviors such as mating, but mammals do not use these same signaling systems. The pheromone is undetectable to humans, pets and other mammals.

### **Should I take any precautions inside my home?**

The treatment will be applied as a mist in a mixture that is mostly water, which carries the pheromone down to the surface (trees, rooftops, plants, ground, etc.). This method of treatment makes it unlikely that the material would directly enter homes or other buildings. However, if it were to do so, health officials have established that this is a very low toxicity material applied in a very dilute concentration. The State of California and US EPA have long maintained systems for tracking illness reports related to treatments and no illnesses have been reported, even in people handling concentrated forms of Checkmate or similar pheromone products used to control other insects. Based on this lack of reported illnesses, no precautions are necessary inside the home. Residents who wish to take precautions may close doors and windows to further minimize exposure.

### **Will the paint on my car be damaged? Should outdoor play equipment be hosed down after applications?**

Testing performed by the United States Department of Agriculture and decades of experience with aerial pheromone treatments in the U.S. and other nations has resulted in no reports of damage to automotive paint, outdoor furniture or other common outdoor surfaces. Based on this information no action is suggested to protect these items.



### **What about outdoor public gatherings on the night of applications?**

CDFA is in contact with local officials, school districts, etc. and has been made aware of evening and night events in the treatment area. The treatments on these nights are scheduled so that the specific sites in question are to be treated in the morning hours toward the end of the shift, after the activities have ended.

### **Should people stay away from public parks and schools the morning after applications?**

It is not necessary to stay away from treated areas after the treatment. Health officials have established that this is a very low toxicity material applied in a very dilute concentration. The State of California and US EPA have long maintained systems for tracking illness reports related to treatments, and no illnesses have been reported, even in people handling concentrated forms of Checkmate or similar pheromone products used to control other insects.

### **Why can't twist ties be used instead?**

Application of twist ties infused with the pheromone is effective in very small areas, such as the 200-meter radius around an individual moth find or a similar area around a handful of tightly contained finds. In such a case, 40-50 staff require about four days to apply an average of about 30-40 twist ties to the trees and plants on each property. Extending such an effort over the proposed 60-square-mile treatment area along the Monterey Peninsula would require 62,000 staff and more than 9 million twist ties. The idea was considered and rejected primarily because of the insufficient supply of twist ties available for use—it would take a minimum of several months for the manufacturers to produce the necessary supply of twist ties, by which time the moths would have multiplied through several additional generations and the infestation would no longer be considered eradicable. The extraordinary staffing and budgetary elements of an operation of this magnitude were also considerations in rejecting this alternative.

### **Why is Monterey being treated before Santa Cruz?**

Experts within the USDA, CDFA and a Technical Working Group of moth and eradication experts from around the world have recommended a progressive series of steps toward eradication of this infestation. The general principle of the eradication effort is to work from the outer edges of the infestation inward toward the core. The specific treatment recommendations began in the summer of 2007 with the deployment of pheromone twist-ties around a number of “outlier” sites where single moths or small numbers of moths were detected in traps that were in relatively isolated locations.

Working inward from these fringes of the infestation, the next recommended step is aerial pheromone release over the Monterey peninsula. The series of treatments would be followed by continued trapping to determine the rate of success of the treatments and to indicate what additional steps may be necessary.

### **Who is paying for this?**

The USDA has provided the bulk of the funding for treatment as well as for the other activities in this program, including plant and crop inspections, traps, outreach and other elements. CDFA and local agricultural officials have also contributed to the project.

### **What if the pheromone treatment doesn't work?**

The pheromone treatments are a central part of a multi-year project that will require multiple tools to be successful. We have already contained the infestation by imposing quarantine restrictions and inspections on plant and crop shipments, and we have suppressed the infestation by deploying pheromone twist-ties in several locations around the fringes of the infested areas. The proposed aerial treatments are the next step in the eradication process. Based on the history of pheromone treatments for this pest in Australia and New Zealand and for similar pests here in the U.S., we have confidence in the success of the proposed treatments. However, if the overall eradication project is not successful, we would have to reconsider whether eradication of the pest is possible under the circumstances. If not, the goal would then become suppression and containment of the infestation over the long term in order to minimize the environmental and economic impact of the infestation.



CALIFORNIA DEPARTMENT OF  
FOOD & AGRICULTURE

**NOVEMBER 2007**

Prepared by the California Department of Food and Agriculture. For the most current version of this document, please visit the department's LBAM web site at [www.cdfa.ca.gov/phpps/PDEP/lbam/lbam\\_main.html](http://www.cdfa.ca.gov/phpps/PDEP/lbam/lbam_main.html)